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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JIANBO LU and TIMOTHY G. OFFERLE

Appeal 2007-2900
Application 10/708,675
Technology Center 3600

Decided: January 30, 2008

Before WILLIAM F. PATE, III, TERRY J. OWENS, and
JENNIFER D. BAHR, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

The Appellants appeal from a rejection of claims 1-16 and 21-26. Claims 17-20 stand objected to but allowable if rewritten in independent form.

THE INVENTION

The Appellants claim a method and system for controlling a vehicle/trailer combination. Claim 1 is illustrative:

1. A method of controlling a vehicle with a trailer comprising:

- determining a presence of the trailer;
- determining a vehicle velocity;
- determining a steering wheel angle;
- determining a rear axle side slip angle of the vehicle; and

applying brake-steer to stabilize the vehicle and trailer when the rear axle slip angle is above a predetermined rear axle slip angle, the vehicle velocity is above a velocity threshold, and the steering wheel angle is about zero.

THE REFERENCES

Bell	US 4,428,596	Jan. 31, 1984
Engle	US 5,452,982	Sep. 26, 1995
Faye	US 2002/0069006 A1	Jun. 06, 2002
Böttiger	US 6,449,542 B1	Sep. 10, 2002
Schmitt	US 6,456,924 B1	Sep. 24, 2002
Wessman	US 6,612,394 B2	Sep. 02, 2003
Breed	US 6,748,797 B2	Jun. 15, 2004

(filed Jan. 19, 2001)

THE REJECTIONS

The claims stand rejected as obvious under 35 U.S.C. § 103 as follows: claims 1, 2, 5, 9, 10, 13, 14, 21, 22 and 25 over Faye in view of Böttiger and Engle;¹ claims 3, 4, 11, 12, 23 and 24 over Faye in view of

¹ Claim 14 is omitted, apparently inadvertently, from the Examiner's statement of the rejections. Because the Appellants do not separately argue that claim we consider it to stand or fall with independent claim 9 from which it depends.

Böttiger, Engle and Breed; claims 6 and 7 over Faye in view of Böttiger, Engle and Bell; claims 8, 15 and 26 over Faye in view of Böttiger, Engle and Wessman; and claim 16 over Faye in view of Böttiger, Engle and Schmitt.

OPINION

We affirm the Examiner's rejections.

Rejection of claims 1, 2, 5, 9, 10, 13, 14, 21, 22 and 25

The Appellants argue independent claim 1, state that independent claim 9 is believed to be allowable for the reasons set forth with respect to claim 1, and separately argue independent claim 21 (Br. 5-6). The Appellants state that claims 2, 5, 10, 13, 22 and 25 stand or fall with their base independent claim (Br. 5-6). For that reason and because claim 14 is considered to stand or fall with claim 9 (*supra*, note 1) we limit our discussion to claims 1 and 21. *See* 37 C.F.R. § 41.37(c)(1)(vii)(2007).

Claim 1

Faye discloses a device and method for stabilizing either a single vehicle or a tractor-trailer unit having a tractor vehicle and a trailer or semi-trailer (§§ 0001, 0021). Faye uses a first determining arrangement to determine vehicle motion quantities that describe the motion of the vehicle (§ 0010). Two tractor vehicle motion quantities, the tractor vehicle's yaw rate and float angle, describe the behavior of the tractor vehicle, and a third vehicle motion quantity, a buckling angle quantity, describes the buckling angle between the tractor vehicle and the trailer or semi-trailer (§ 0021). A second determining arrangement determines a characteristic quantity which

corresponds to a setpoint that is a function of the steering angle (¶¶ 0008, 0010, 0010, 1107). The steering angle represents the driver's intent, and a velocity quantity, advantageously the tractor vehicle's velocity, represents the state of the vehicle (¶¶ 0015, 0017). Faye uses a control arrangement to determine intervention quantities as a function of the vehicle motion quantities and the characteristic quantity (¶ 0010). "These intervention quantities are supplied to an actuator arrangement to perform brake interventions and/or engine interventions in order to stabilize the vehicle." *See id.*

Böttiger discloses a method for automatically controlling lateral dynamics of a vehicle having front-wheel steering by determining deviations of continuously measured actual values of the yaw velocity from continuously generated desired values of the yaw velocity, and adjusting the actual values by setting wheel steering angles and/or setting wheel braking forces (col. 1, ll. 8-15). As the result of automatic control of the yaw velocity the slip angle at the vehicle's unsteered rear wheels during a cornering operation is limited to a value compatible with the vehicle's dynamic stability (col. 3, ll. 7-13; col. 4, ll. 6-10). Uncoupling the sideslip dynamics of the rear axle from those of the front axle provides control in a particularly simple manner that prevents swerving of the vehicle (col. 2, ll. 30-39).

The Appellants argue that Faye does not disclose determining the presence of a trailer (Br. 5). Faye teaches that two vehicle motion quantities describe the position and/or the behavior of the trailer or semi-trailer with

respect to the tractor vehicle (§ 0021). Detecting that the trailer or semi-trailer is present is a prerequisite to describing the position and/or the behavior of the trailer or semi-trailer with respect to the tractor vehicle.

The Appellants acknowledge that Böttiger determines side slip angle in the area of the rear wheels (Br. 5). The Appellants argue that Böttiger has nothing to do with trailering a vehicle and, therefore, is not properly combinable with Faye. *See id.* Böttiger is silent as to whether Böttiger's disclosure is applicable to tractor-trailers. Faye's disclosure that slip angle quantities of the individual wheels are determined (§ 0045) would have indicated to one of ordinary skill in the art that Böttiger's determination of the unsteered wheels' sideslip angle (col. 4, ll. 6-10) is relevant to Faye's method. Even though Böttiger is silent as to whether the disclosed method pertains to tractor-trailers, Faye's disclosure that Faye's device can be used for both single vehicles and tractor-trailers (§§ 0021, 0032) would have provided one of ordinary skill in the art with an apparent reason to use Böttiger rear wheels sideslip angle as a factor in stabilizing the tractor vehicle in Faye's tractor-trailer combination. *See KSR Int'l. Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1740-41 (2007) ("Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue"). Hence, the use of Böttiger's rear wheels sideslip angle in stabilizing Faye's

tractor-trailer would have been *prima facie* obvious to one of ordinary skill in the art.

The Appellants argue that Böttiger “does not teach or suggest applying brake-steer when the rear axle slip angle is above a predetermined slip angle, the vehicle velocity is above a vehicle velocity threshold, and the vehicle steering wheel angle is about zero” (Br. 5). Faye’s disclosure that brake interventions are used to stabilize the vehicle (§ 0010) would have led one of ordinary skill in the art, through no more than ordinary creativity, to use brake steer to stabilize the vehicle when relevant factors such as vehicle velocity as disclosed by Faye (§ 0017) and rear wheels sideslip angle as disclosed by Böttiger (abstract) exceed desired limits. *See KSR*, 127 S.Ct. at 1741 (In making the obviousness determination one “can take account of the inferences and creative steps that a person of ordinary skill in the art would employ”). Faye’s disclosure that the steering angle represents the driver’s desired intent (§ 0017) would have led one of ordinary skill in the art to use brake steer when the steering wheel angle indicates the driver’s intent to drive straight ahead but other factors such as the vehicle velocity and rear wheels sideslip angle exceed their limits and, therefore, are inconsistent with that intent.

For the above reasons we are not convinced of reversible error in the rejection of claim 1 or claims 2, 5, 9, 10, 13 and 14 that fall therewith.

Claim 21

The Appellants rely upon the arguments set forth with respect to claim 1 (Br. 6). Those arguments are not persuasive for the reasons given above regarding the rejection of that claim.

The Appellants also argue that there is no teaching or suggestion in the references to determine the divergence of a sensor yaw rate and a hand wheel yaw rate. *See id.* The Appellants' hand wheel yaw rate is a desired yaw rate calculated based upon a hand wheel angle position signal which reflects the driver's intent (Spec. ¶ 0138). Faye determines a characteristic quantity which corresponds to a setpoint that is a function of the steering angle and the vehicle velocity (¶¶ 0008, 0010, 0017). The setpoint is initially determined using a vehicle model based on the steering angle, which represents the driver's intent, and the vehicle velocity, which represents the vehicle's condition and, if the underlying control is a vehicle dynamics control using yaw rate control, a yaw rate setpoint is determined (¶ 0027). Intervention quantities are determined based in part upon the characteristic quantity and vehicle motion quantities, one of which is the sensor-determined tractor vehicle yaw rate (¶¶ 0010, 0021, 0038). Thus, Faye determines a yaw rate setpoint, based upon the steering angle and vehicle velocity, to which the sensor yaw rate is to be compared for determining intervention quantities.

We therefore are not persuaded of reversible error in the rejection of claim 21 and claims 22 and 25 that fall therewith.

Rejections of claims 3, 4, 6-8 11, 12, 15, 16, 23, 24 and 26

Although additional references are applied to claims 3, 4, 6-8, 11, 12, 15, 16, 23, 24 and 26, the Appellants rely regarding those claims upon the same arguments set forth with respect to their independent claims (Br. 8). Those arguments are not convincing for the reasons given above regarding the independent claims.

DECISION

The rejections under 35 U.S.C. § 103 of claims 1, 2, 5, 9, 10, 13, 14, 21, 22 and 25 over Faye in view of Böttiger and Engle, claims 3, 4, 11, 12, 23 and 24 over Faye in view of Böttiger, Engle and Breed, claims 6 and 7 over Faye in view of Böttiger, Engle and Bell, claims 8, 15 and 26 over Faye in view of Böttiger, Engle and Wessman, and claim 16 over Faye in view of Böttiger, Engle and Schmitt are affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

vsh

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